

New Hampshire Volunteer Lake Assessment Program

2002 Bi-Annual Report for Highland Lake Stoddard



NHDES
Water Division
Watershed Management Bureau
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OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **HIGHLAND LAKE, STODDARD**, the program coordinators recommend the following actions.

FIGURE INTERPRETATION

- **Figure 1 and Table 1:** The graphs in Figure 1 (Appendix A) show the historical and current year chlorophyll-a concentration in the water column. Table 1 (Appendix B) lists the maximum, minimum, and mean concentration for each sampling season that the lake/pond has been monitored through the program.

Chlorophyll-a, a pigment naturally found in plants, is an indicator of the algal abundance. Because algae are usually microscopic plants that contain chlorophyll-a, and are naturally found in lake ecosystems, the chlorophyll-a concentration found in the water gives an estimation of the concentration of algae or lake productivity. **The mean (average) summer chlorophyll-a concentration for New Hampshire's lakes and ponds is 7.02 ug/L.**

Similar to the summer of 2001, the summer of 2002 was filled with many warm and sunny days and there was a lower than normal amount of rainfall during the latter-half of the summer. The combination of these factors resulted in relatively warm surface waters throughout the state. The lack of fresh water to the lakes/ponds reduced the rate of flushing which may have resulted in water stagnation. Due to these conditions, many lakes and ponds experienced increased algae growth, including filamentous green algae (the billowy clouds of green algae typically seen floating near shore), and some lakes/ponds experienced nuisance cyanobacteria (blue-green algae) blooms.

NORTH STATION

The current year data (the top graph) show that the chlorophyll-a concentration **decreased slightly** from June to July, **increased** from July to August, and then **decreased** from August to September. The chlorophyll concentration was **greater than** the state mean in August.

The historical data (the bottom graph) show that the 2002 chlorophyll-a mean is ***slightly less than*** state mean.

Overall, the statistical analysis of the historical data show that the chlorophyll-a concentration has ***significantly decreased*** since monitoring began. Specifically, the chlorophyll-a concentration has ***decreased*** (meaning ***improved***) on average ***by approximately 6 percent*** per sampling season during the sampling period **1988 to 2002**. (Note: Please refer to Appendix E for the detailed statistical analysis explanation and data print out.) We hope this trend continues!

SOUTH STATION

The current year data (the top graph) show that the chlorophyll-a concentration ***increased*** from June to July, ***decreased*** from July to August, and then ***increased*** from August to September. The chlorophyll-a concentration in July and August was ***greater than*** the state mean.

The historical data (the bottom graph) show that the 2002 chlorophyll-a mean is ***slightly greater than*** the state mean.

Overall, visual inspection of the historical data trend line (the bottom graph) shows ***a variable*** in-lake chlorophyll-a trend, meaning that the concentration has ***fluctuated*** since monitoring began in 1994. After 10 consecutive years of sample collection, we will be able to conduct a statistical analysis of the historic data to objectively determine if there has been a significant change in the annual mean chlorophyll-a concentration since monitoring began.

While algae are naturally present in all lakes/ponds, an excessive or increasing amount of any type is not welcomed. In freshwater lakes/ponds, phosphorus is the nutrient that algae depend upon for growth. Therefore, algal concentrations may increase when there is an increase in nonpoint sources of nutrient loading from the watershed, or in-lake sources of phosphorus loading (such as phosphorus releases from the sediments). It is important to continually educate residents about how activities within the watershed can affect phosphorus loading and lake quality.

- **Figure 2 and Table 3:** The graphs in Figure 2 (Appendix A) show historical and current year data for lake/pond transparency. Table 3 lists the maximum, minimum and mean transparency data for each sampling season that the lake/pond has been monitored through the program.

Volunteer monitors use the Secchi-disk, a 20 cm disk with alternating black and white quadrants, to measure water clarity (how far a

person can see into the water). Transparency, a measure of water clarity, can be affected by the amount of algae and sediment from erosion, as well as the natural colors of the water. **The mean (average) summer transparency for New Hampshire's lakes and ponds is 3.7 meters.**

Two different weather related patterns occurred this past spring and summer that influenced lake quality during the summer season.

In late May and early June of 2002, numerous rainstorms occurred. Stormwater runoff associated with these rainstorms may have increased phosphorus loading, and the amount of soil particles washed into waterbodies throughout the state. Some lakes and ponds experienced lower than typical transparency readings during late May and early June.

However, similar to the 2001 sampling season, the lower than average amount of rainfall and the warmer temperatures during the latter-half of the summer resulted in a few lakes/ponds reporting their best-ever Secchi-disk readings in July and August (a time when we often observe reduced clarity due to increased algal growth)!

NORTH STATION

The current year data (the top graph) show that the in-lake transparency **increased** from June to August, and then **decreased** from August to September.

The historical data (the bottom graph) show that the 2002 mean transparency is **less than** the state mean.

Overall, the statistical analysis of the historical data (the bottom graph) show that the mean annual in-lake transparency has **not significantly changed** (either *increased* or *decreased*) since monitoring began in **1988**. Specifically, the in-lake transparency has **varied** (meaning *fluctuated*), but has not *continually increased* or *decreased* since monitoring began. (Note: Please refer to Appendix E for the statistical analysis explanation and data print out.)

SOUTH STATION

The current year data (the top graph) show that the in-lake transparency **remained relatively stable** from June to August, and then **decreased slightly** from August to September.

Overall, visual inspection of the historical data trend line (the bottom graph) shows **a relatively stable** trend for in-lake transparency, meaning that the transparency has **remained approximately the same** since monitoring began in 1994. As discussed previously, after

10 consecutive years of sample collection, we will be able to conduct a statistical analysis of the historic data to determine long-term trends.

Typically, high intensity rainfall causes erosion of sediments into lakes/ponds and streams, thus decreasing clarity. Efforts should continually be made to stabilize stream banks, lake/pond shorelines, disturbed soils within the watershed, and especially dirt roads located immediately adjacent to the edge of tributaries and the lake/pond. Guides to Best Management Practices designed to reduce, and possibly even eliminate, nonpoint source pollutants, such as sediment loading, are available from NHDES upon request.

- **Figure 3 and Table 8:** The graphs in Figure 3 (Appendix A) show the amounts of phosphorus in the epilimnion (the upper layer) and the hypolimnion (the lower layer); the inset graphs show current year data. Table 8 (Appendix B) lists the annual maximum, minimum, and median concentration for each deep spot layer and each tributary since the lake/pond has joined the program.

Phosphorus is the limiting nutrient for plant and algae growth in New Hampshire's freshwater lakes and ponds. Too much phosphorus in a lake/pond can lead to increases in plant and algal growth over time. **The median summer total phosphorus concentration in the epilimnion (upper layer) of New Hampshire's lakes and ponds is 11 ug/L. The median summer phosphorus concentration in the hypolimnion (lower layer) is 14 ug/L.**

NORTH STATION

The current year data for the epilimnion (the top inset graph) show that the total phosphorus concentration **decreased steadily** from June to August and then **increased** from August to September. The total phosphorus concentration in June was **slightly greater than** the state median.

The historical data show that the 2002 mean epilimnetic total phosphorus concentration is **slightly less than** the state median.

The current year data for the hypolimnion (the bottom inset graph) show that the total phosphorus concentration **increased greatly** from June to July, **decreased greatly** from July to August, and then **remained stable** from August to September. The total phosphorus concentration in July was **greater than** the state median.

The historical data show that the 2002 mean hypolimnetic total phosphorus concentration is **slightly less than** the state median.

Overall, the statistical analysis of the historical data show that the total phosphorus concentration in the epilimnion (upper layer) and

the hypolimnion (lower layer) has ***not significantly changed*** (either *increased* or *decreased*) since monitoring began in **1988**. Specifically, the total phosphorus concentration in the epilimnion and hypolimnion has ***varied*** (meaning ***fluctuated***), but has not *continually increased* or *decreased* since monitoring began. (Note: Please refer to Appendix E for the statistical analysis explanation and data print out.)

SOUTH STATION

The current year data for the epilimnion (the top inset graph) show that the total phosphorus concentration ***decreased*** from June to July, and then ***increased*** from July to September. The total phosphorus concentration in June, July, and August was ***greater than*** the state median in June and September.

The historical data show that the 2002 mean epilimnetic total phosphorus concentration is ***slightly greater than*** the state median.

The current year data for the hypolimnion (the bottom inset graph) show that the total phosphorus concentration ***remained relatively stable*** from June to August, and then ***increased greatly*** from August to September. The total phosphorus concentration in September was ***greater than*** the state median.

The historical data show that the 2002 mean hypolimnetic total phosphorus concentration is ***slightly less than*** the state median.

Overall, visual inspection of the historical data trend line for the epilimnion and hypolimnion show ***a slightly decreasing*** total phosphorus trend, which means that the concentration has ***slightly improved*** in the epilimnion and hypolimnion since monitoring began.

One of the most important approaches to reducing phosphorus loading to a waterbody is to continually educate watershed residents about its sources and how excessive amounts can adversely impact the ecology and value of lakes and ponds. Phosphorus sources within a lake or pond's watershed typically include septic systems, animal waste, lawn fertilizer, road and construction erosion, and natural wetlands. If you would like to educate watershed residents about how they can help to reduce phosphorus loading into the lake/pond, please contact the VLAP Coordinator.

TABLE INTERPRETATION

➤ Table 2: Phytoplankton

Table 2 lists the current and historic phytoplankton species observed in the lake/pond.

The dominant phytoplankton species observed this year at the **NORTH STATION** were *Elakatothrix* (a green algae) and *Peridinium* (a dinoflagellate).

The dominant phytoplankton species observed this year at the **SOUTH STATION** were *Elakatothrix* (a green algae), *Navicula* (a diatom), and *Synedra* (a diatom).

Phytoplankton populations undergo a natural succession during the growing season (Please refer to page 12 of the “Biological Monitoring Parameters” section of this report for a more detailed explanation regarding seasonal plankton succession). Diatoms and golden-brown algae are typical in New Hampshire’s less productive lakes and ponds. An overabundance of cyanobacteria (previously referred to as blue-green algae) indicates that there may be an excessive total phosphorus concentration in the lake/pond, or that the ecology is out of balance.

➤ **Table 2: Cyanobacteria (Blue-green algae)**

Small amounts of the cyanobacterium *Aphanizomenon* and *Anabaena* were observed in the **SOUTH STATION** plankton sample this season. ***These species, if present in large amounts, can be toxic to livestock, wildlife, pets, and humans.*** Cyanobacteria can reach nuisance levels when excessive nutrients and favorable environmental conditions occur.

As with the summer of 2001, we observed that some lakes and ponds had cyanobacteria present during the 2002 summer season, likely due to the many warm and sunny days that occurred this summer, which may have accelerated algal and bacterial growth. In addition, the lower than normal amount of rainfall during the latter half of the summer, meant that the slow flushing rates resulted in less phosphorus exiting the lake outlet and more phosphorus being available for plankton growth.

The presence of cyanobacteria serves as a reminder of the lake’s/pond’s delicate balance. Watershed residents should continue to act proactively to reduce nutrient loading into the lake/pond by eliminating fertilizer use on lawns, keeping the lake/pond shoreline natural, re-vegetating cleared areas within the watershed, and properly maintaining septic systems and roads.

In addition, residents should also observe the lake/pond in September and October during the time of fall turnover (lake mixing) to document any algal blooms that may occur. Cyanobacteria (blue-green algae) have the ability to regulate their depth in the water column by producing or releasing gas from vesicles. However, occasionally lake mixing can affect their buoyancy and cause them to

rise to the surface and bloom. Wind and currents tend to “pile” cyanobacteria into scums that accumulate in one section of the lake/pond. If a fall bloom occurs, please contact the VLAP Coordinator.

➤ **Table 4: pH**

Table 4 (Appendix B) presents the in-lake and tributary current year and historical pH data.

pH is measured on a logarithmic scale of 0 (acidic) to 14 (basic). pH is important to the survival and reproduction of fish and other aquatic life. A pH below 5.5 severely limits the growth and reproduction of fish. A pH between 6.5 and 7.0 is ideal for fish. The mean pH value for the epilimnion (upper layer) in New Hampshire’s lakes and ponds is 6.5, which indicates that the surface waters in state are slightly acidic. For a more detailed explanation regarding pH, please refer to page 16 of the “Chemical Monitoring Parameters” section of this report.

The mean pH at the **NORTH STATION** deep spot this season ranged from **5.72** in the hypolimnion to **5.88** in the epilimnion, which means that the water is ***moderately acidic***.

The mean pH at the **SOUTH STATION** deep spot this season ranged from **6.09** in the hypolimnion to **6.13** in the epilimnion, which means that the water is ***moderately acidic***.

Due to the presence of granite bedrock in the state and the deposition of acid rain, there is not much that can be done to effectively increase lake/pond pH.

➤ **Table 5: Acid Neutralizing Capacity**

Table 5 in Appendix B presents the current year and historic epilimnetic ANC for each year the lake/pond has been monitored through VLAP.

Buffering capacity or ANC describes the ability of a solution to resist changes in pH by neutralizing the acidic input to the lake. For a more detailed explanation, please refer to page 16 of the “Chemical Monitoring Parameters” section of this report.

The Acid Neutralizing Capacity (ANC) of the epilimnion (the upper layer) continues to remain ***low*** at both deep spots (Table 5). Specifically, this means that the lake/pond is ***“extremely vulnerable”*** to acidic inputs (such as acid precipitation) and has a ***lower*** ability than many lakes and ponds in the state to buffer against acidic inputs.

➤ **Table 6: Conductivity**

Table 6 in Appendix B presents the current and historic conductivity values for tributaries and in-lake data. Conductivity is the numerical expression of the ability of water to carry an electric current. For a more detailed explanation, please refer to page 16 of the “Chemical Monitoring Parameters” section of this report.

The conductivity in the lake/pond is relatively **low**, but has **increased slightly** since monitoring began. Typically conductivity levels greater than 100 uMhos/cm indicate the influence of human activities on surface water quality. These activities include septic system leachate, agricultural runoff, iron deposits, and road runoff (which contains road salt during the spring snow melt).

➤ **Table 8: Total Phosphorus**

Table 8 in Appendix B presents the current year and historic total phosphorus data for in-lake and tributary stations. Phosphorus is the nutrient that limits the algae’s ability to grow and reproduce. Please refer to page 17 of the “Chemical Monitoring Parameters” section of this report for a more detailed explanation.

The total phosphorus concentration was **elevated** in the **Barden Pond** sample on the **July 14th** sampling event. The total phosphorus concentration was **elevated** in the **Rice Brook** sample on the **August 18th** sampling event. These stations have had a history of **fluctuating** total phosphorus concentrations.

We recommend that your monitoring group conduct stream surveys and stormwater sampling along these inlet so that we can determine what may be causing the elevated levels. For a detailed explanation on how to conduct a stream survey and stormwater sampling, please refer to this year’s “Special Topic Article” which is included in Appendix D of this report.

➤ **Table 9 and Table 10: Dissolved Oxygen and Temperature Data**

Table 9 in Appendix B shows the dissolved oxygen/temperature profile(s) for the 2002 sampling season. Table 10 shows the historical and current year dissolved oxygen concentration in the hypolimnion (lower layer). The presence of dissolved oxygen is vital to fish and amphibians in the water column and also to bottom-dwelling organisms. Please refer to the “Chemical Monitoring Parameters” section of this report for a more detailed explanation.

The dissolved oxygen concentration was relatively **high** at all depths sampled at the both deep spots of the lake/pond. As stratified lakes/ponds age, oxygen becomes **depleted** in the hypolimnion (lower

layer) by the process of decomposition. Specifically, the loss of oxygen in the hypolimnion results primarily from the process of biological oxidation of organic matter (i.e.; biological organisms using oxygen to break down organic matter), both in the water column and particularly at the bottom of the lake/pond where the water meets the sediment. The **high** oxygen level in the hypolimnion is a sign of the lake's/pond's overall good health.

➤ **Table 11: Turbidity**

Table 11 in Appendix B lists the current year and historic data for in-lake and tributary turbidity. Turbidity in the water is caused by suspended matter, such as clay, silt, and algae. Water clarity is strongly influenced by turbidity. Please refer to page 19 of the “Other Monitoring Parameters” section of this report for a more detailed explanation.

The turbidity of the hypolimnion (lower layer) sample was elevated on the **August 18th** sampling event. This suggests that the lake/pond bottom may have been disturbed by the anchor or by the Kemmerer Bottle while sampling. When the lake/pond bottom is disturbed, sediment, which typically contains attached phosphorus, is released into the water column. When collecting the hypolimnion sample, please check to make sure that there is no sediment in the Kemmerer Bottle before filling the sample bottles.

The turbidity in the **Anderson Road** sample was **very high** on the **August 18th** sampling event. This suggests that the stream bottom may have been disturbed while sampling, or that erosion is occurring within this portion of the watershed. When the stream bottom is disturbed, sediment, which typically contains attached phosphorus, is released into the water column. When collecting samples in the inlets, please be sure to sample where there the stream is flowing and where the stream is deep enough to collect a “clean” sample.

The turbidity in the **Carr Brook** sample was **very high** on the **September 15th** sampling event. On the field data sheets for the September 15th sampling event, the volunteer monitors indicated that there was no flow in Carr Brook. This suggests that the Carr Brook sample bottle was filled from water from a stagnant pool.

Please do not sample tributaries that are not flowing. Due to the lack of flushing, stagnant water typically contains elevated amounts of chemical and biological constituents that will lead to erroneous results. In addition, please do not sample tributaries that are too shallow to collect a “clean” sample (i.e.; free from sediment and organic debris). You may need to move upstream or downstream to collect a “clean” sample. If the stream is not deep enough and the

bottom sediment is disturbed while sampling, the phosphorus concentration in the sample will likely be elevated.

➤ **Table 12: Bacteria (*E.coli*)**

Table 12 lists the current year data for bacteria (*E.coli*) testing. *E. coli* is a normal bacterium found in the large intestines in humans and other warm-blooded animals. *E.coli* is used as an indicator organism because it is easily cultured, and its presence in the water, in defined amounts, indicates that sewage **MAY** be present. If sewage is present in the water, potentially harmful pathogens may also be present. Please consult page 20 of the “Other Monitoring Parameters section of the report for the current standards for *E. coli* in surface waters. If residents are concerned about sources of *E.coli* such as septic system impacts, animal waste, or waterfowl waste, it is best to conduct *E. coli* testing when the water table is high or after rain events.

An extensive *E.coli* sampling program was conducted this season by the volunteer monitors. The results were all **low**. Specifically, results were **33** counts or less, which is **well below** the state standard of 406 counts per 100 mL for designated surface waters, and 88 counts per 100 mL for designated public beaches.

If you are concerned about *E. coli* levels at any locations in the watershed, you may want to conduct ***E.coli*** testing on a weekend during heavy beach use or after a rain event. Since bacteria die quickly in cool pond waters, testing is most accurate and most representative of the health risk to bathers when the source (humans, animals, or waterfowl) is present.

DATA QUALITY ASSURANCE AND CONTROL

Annual Assessment Audit:

Please contact the VLAP Coordinator early this season to schedule the annual visit with the DES biologist on a day when the monitors plan to collect samples. This season, the DES biologist visited the lake one day after the group had collected samples. The DES biologist conducted the dissolved oxygen profile and the plankton sampling and then returned the samples the volunteer monitors had collected to the lab.

For quality assurance reasons, we have determined that this arrangement did not work well this season. It is a good idea for the Biologist to actually sample with the volunteer monitors during the annual visit to your lake/pond. This will allow the biologist to conduct a “Sampling Procedures Assessment Audit” for your monitoring group. This assessment is used to identify any aspects of sample collection in which volunteer monitors are not following the proper procedures, and

also provides an opportunity for the biologist to retrain the volunteer monitors as necessary. This will ultimately ensure that the samples that the volunteer monitors collect are truly representative of actual lake and tributary conditions.

Sample Receipt Checklist:

Each time your monitoring group dropped off samples at the laboratory this summer, the laboratory staff completed a sample receipt checklist to assess and document if the volunteer monitors followed proper sampling techniques when collecting the samples. The purpose of the sample receipt checklist is to minimize, and hopefully eliminate, future re-occurrences of improper sampling techniques.

Overall, the sample receipt checklist showed that your monitoring group did a **good** job when collecting samples this season! Specifically, the members of your monitoring group followed the most of the proper field sampling procedures when collecting and submitting samples to the laboratory. However, the laboratory staff has identified a few aspects of sample collection that could be improved upon.

- **Tributary Sampling:** On the July 15th sampling event, the laboratory staff indicated that sediment was observed in the majority of the tributary sample bottles. Please do not sample tributaries that are too shallow to collect a “clean” sample (i.e.; free from sediment and organic debris). You may need to move upstream or downstream to collect a “clean” sample. If the stream is not deep enough and the bottom sediment is disturbed while sampling, the phosphorus concentration in the sample will likely be elevated.

In addition, please do not sample tributaries if the bottom sediment has been disturbed as this will likely result in an elevated phosphorus concentration. If you disturb the stream bottom while sampling, please rinse out the bottle and move to an upstream location so that you can sample in an undisturbed area.

- **Holding Time:** The samples that were collected by your monitoring group on the **August 18th** sampling event (starting at **7:50 am**) were returned to the lab on **August 19th** at approximately **1:00 pm**. This means the samples were more than **30** hours old. Therefore, the NHDES Chemistry lab would not accept the ***E.coli*** samples for analysis.

Please remember to return samples to the laboratory **within 24 hours of sample collection**. This will ensure that samples do not degrade before they are analyzed. If you plan to sample on the weekend, please sample on Sunday, preferably in the afternoon, and return samples to the lab first thing on Monday morning to ensure

that samples can be analyzed within 24 hours. As stated previously, *E.coli* samples that are more than 30 hours old **will not be** accepted by the laboratory for analysis. The Limnology Center will not accept samples that are greater than 48 hours old for analysis.

- **Sample Labels:** On the **August 18th** sampling event, more than one sample bottle was missing a label and it was not possible for the lab or the volunteer monitors to determine which sample bottles corresponded to what sampling locations. It is possible that the volunteers may have forgotten to label the bottles or a non-waterproof pen was used, or the sample labels did not stick. **Therefore, three total phosphorus bottles were rejected for analysis.** Please make sure to label your samples with a waterproof pen (a black sharpie permanent marker works best), preferably before sampling. If your association has made its own sample bottle labels, please make sure to fold over one corner of each label before placing it on a sample bottle so that the label will not become permanently attached to the bottle. In addition, please make sure that the labels will stick to the bottles when they are wet.

- **Field Data Sheet:** On the **September 15th** sampling event, the volunteer monitors did not indicate on the field data sheet what time the samples were collected. Please make sure to fill out each field data sheet completely, including indicating the time that the samples were collected. This will enable the laboratory staff to determine if the sample holding times were exceeded.

NOTES

Monitor's Note (6/23/02): Considerable turbidity in stream and in lake because of the extent of heavy rain in this region.

Monitor's Note (7/14/02): Anderson Road sample is from a runoff brook which is not active during late summer. The tributaries are drying up. The lake level is down approximately 3". No rain this past week. Rice Brook tributary dried up so samples could not be taken.

Monitor's Note (8/18/02): Rook very low with very little flow. Rice Brook tributary completely dry. One thunderstorm on 8/16 (Friday evening). First rain in two weeks. Carr Brook not flowing under Shed Road culvert so sample taken in small pond west of the road.

Laboratory Note (8/17/02 2:00 pm): All samples are more than 24 hours old since the samples were collected on 8/16 starting at 7:50am. The white bottles (pH, ANC, turbidity, conductivity) and chlorophyll samples were run in the Limnology Center because the samples were less

than 24 hours old. The DES Chemistry Lab would not accept the *E.coli* samples for analysis because the samples were more than 30 hours old.

Laboratory Note (8/18/02): A few bottles were missing labels. Some sample bottle labels appear to have become wet while in the sample cooler and fell off the bottles. No epilimnion phosphorus sample for the south station. No phosphorus sample for Carr Brook West. No phosphorus sample for the Pickerel Cove Brook.

Monitor's Note (9/15/02): No flow in Rice Brook, Kennedy Brook, Carr Brook and Pickerel Creek tributaries. No significant rain since 8/24. The lake level is down approximately 6".

USEFUL RESOURCES

Changes to the Comprehensive Shoreland Protection Act: 2001 Legislative Session, NHDES Fact Sheet, (603) 271-3505, or www.des.state.nh.us/factsheets/sp/sp-8.htm

Cyanobacteria in New Hampshire Waters Potential Dangers of Blue-Green Algae Blooms, NHDES Fact Sheet, (603) 271-3505, or www.des.state.nh.us/factsheets/wmb/wmb-10.htm

The Lake Pocket Book. Prepared by The Terrene Institute, 2000. (internet: www.terrene.org, phone 800-726-4853)

Organizing Lake Users: A Practical Guide. Written by Gretchen Flock, Judith Taggart, and Harvey Olem. Copies are available from the Terrene Institute (internet: www.terrene.org, phone 800-726-4853)

Proper Lawn Care in the Protected Shoreland: The Comprehensive Shoreland Protection Act, WD-SP-2, NHDES Fact Sheet, (603) 271-3503 or www.des.state.nh.us/factsheets/sp/sp-2.htm

Sand Dumping - Beach Construction, WD-BB-15, NHDES Fact Sheet, (603) 271-3503 or www.des.state.nh.us/factsheets/bb/bb-15.htm

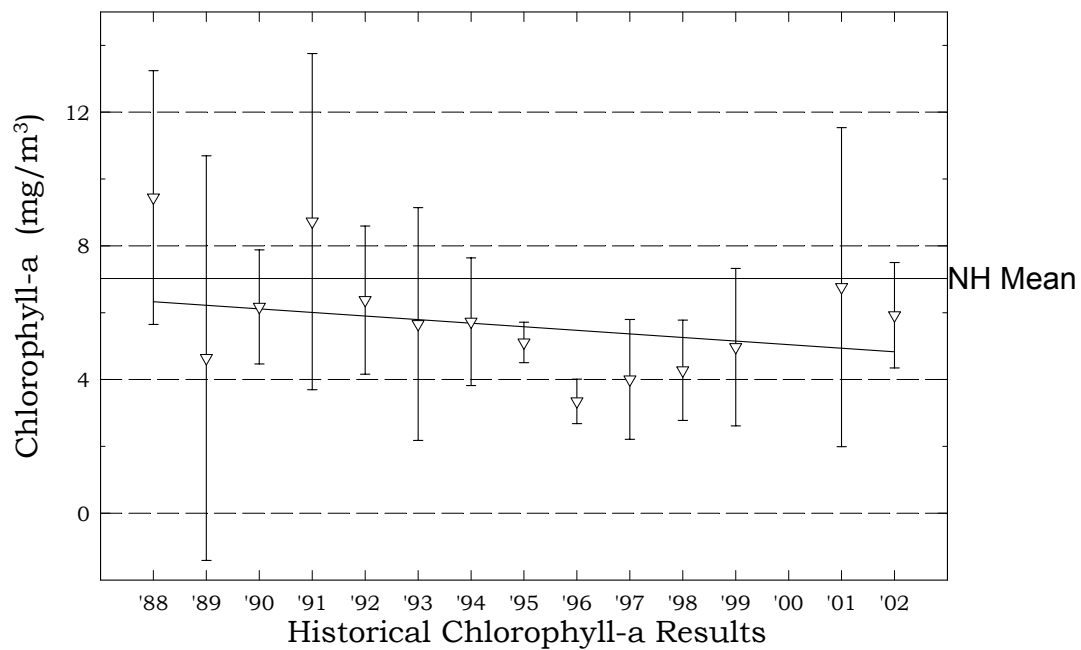
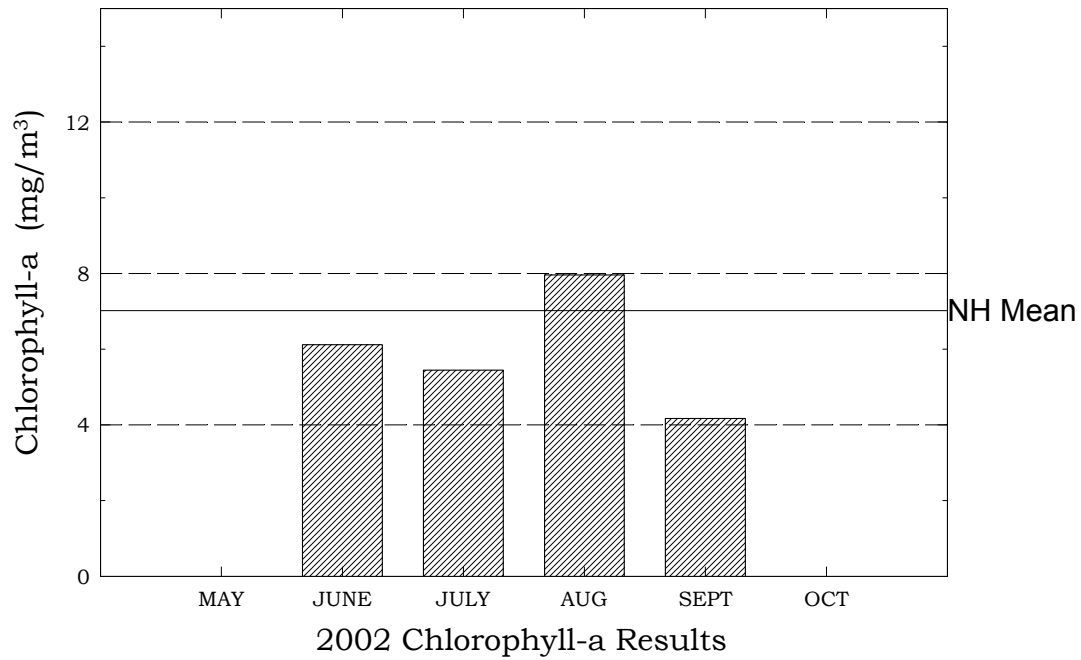
Use of Lakes or Streams for Domestic Water Supply, WD-WSEB-1-11, NHDES Fact Sheet, (603) 271-3503 or www.des.state.nh.us/factsheets/ws/ws-1-11.htm

Weed Watchers: An Association to Halt the Spread of Exotic Aquatic Plants, WD-BB-4, NHDES Fact Sheet, (603) 271-3503 or www.des.state.nh.us/factsheets/bb/bb-4.htm

Appendix A: Graphs

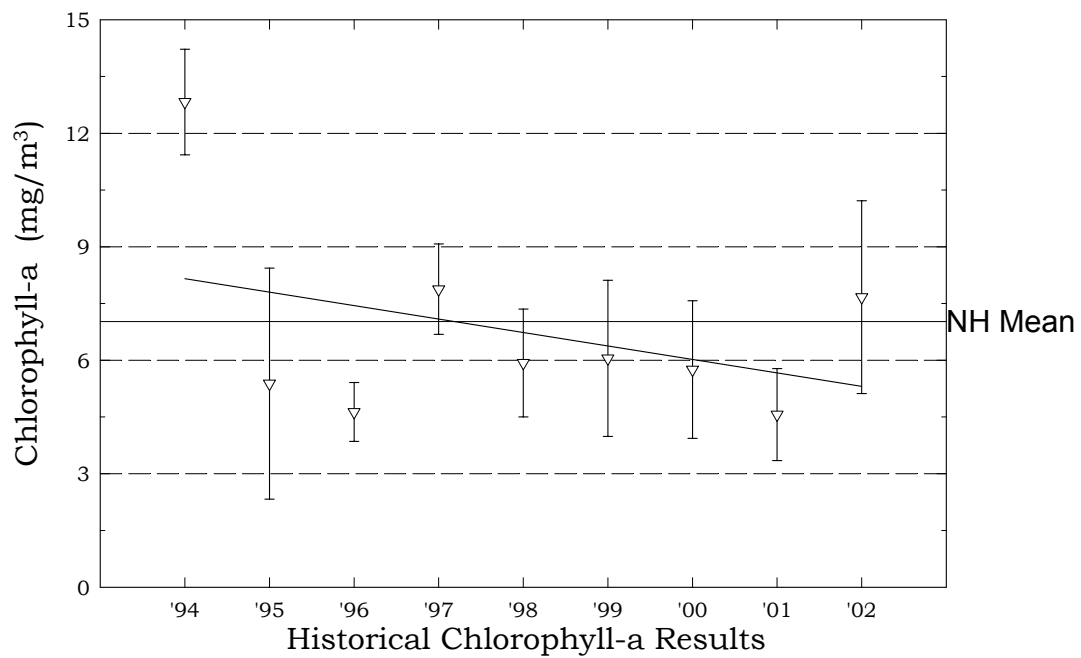
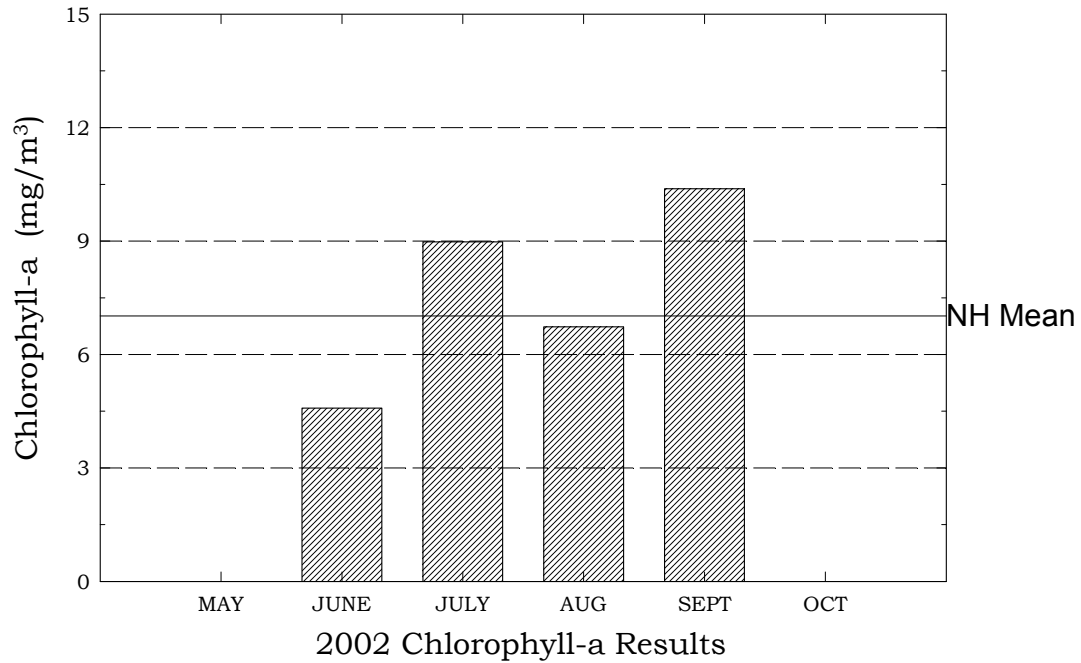
Highland Lake, North, Stoddard

Figure 1. Monthly and Historical Chlorophyll-a Results



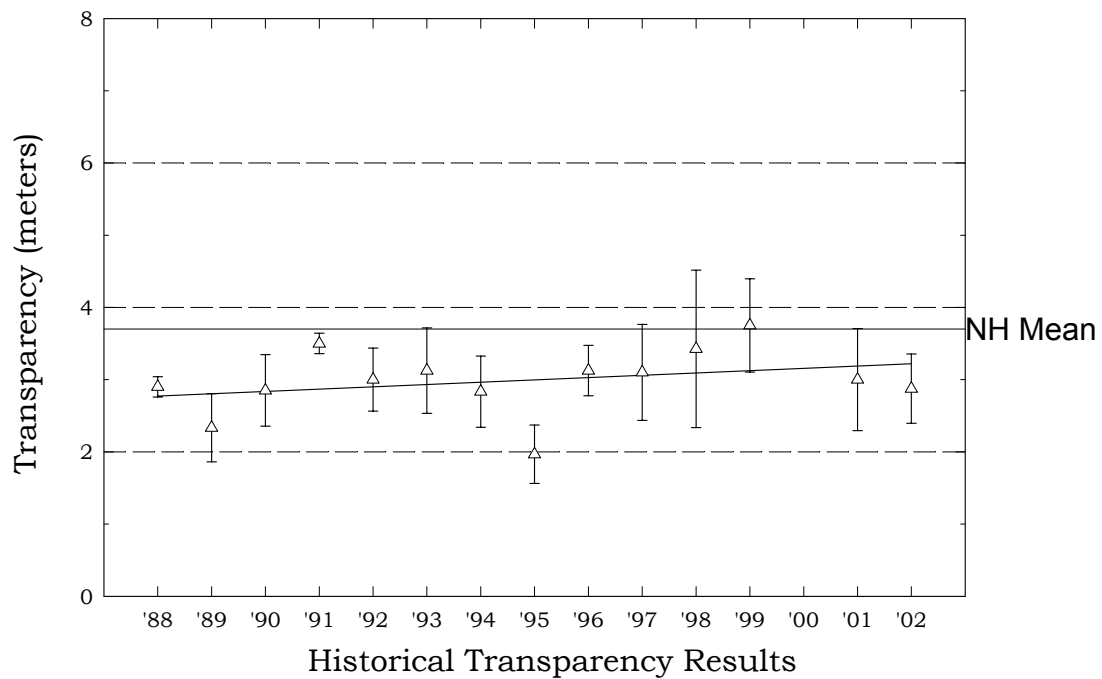
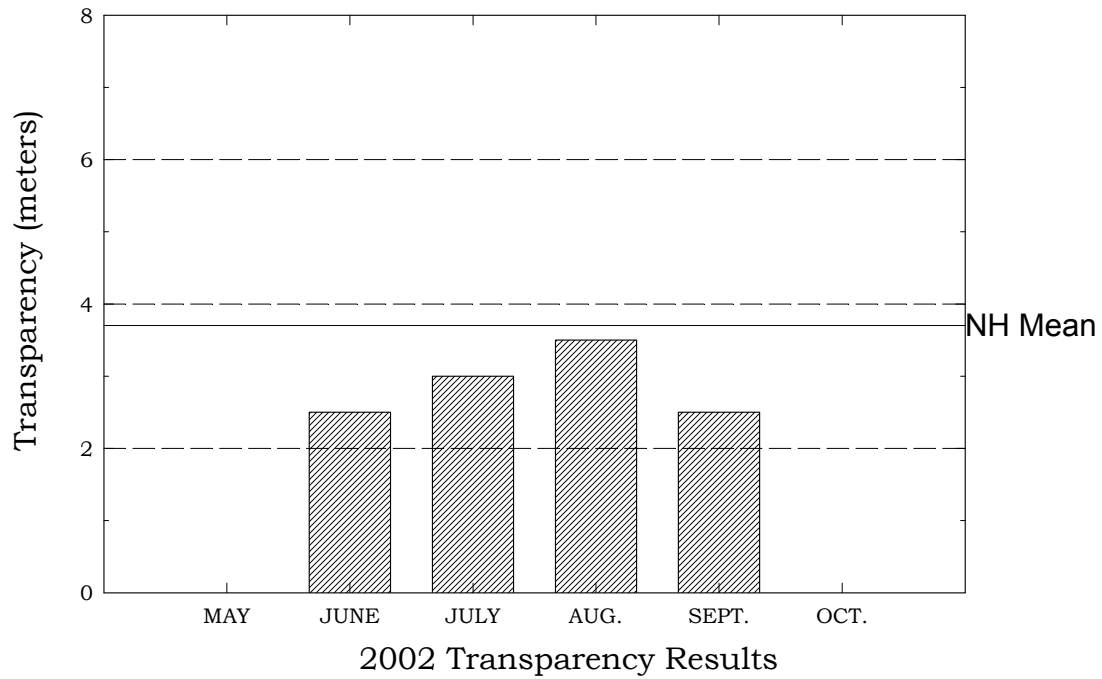
Highland Lake, South, Stoddard

Figure 1. Monthly and Historical Chlorophyll-a Results



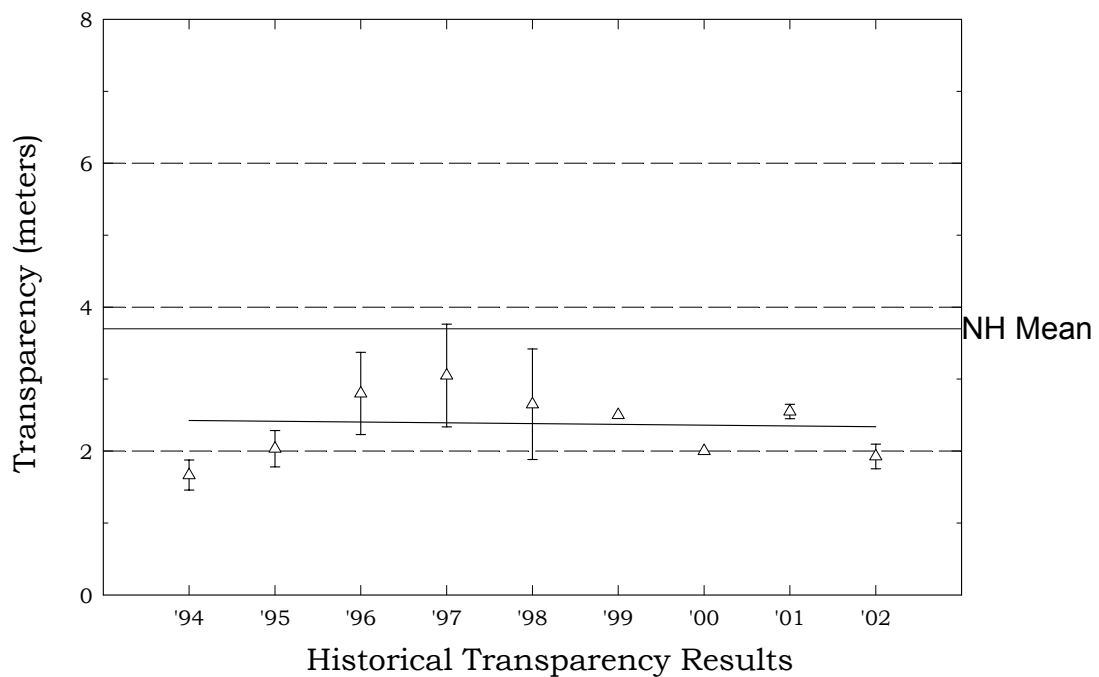
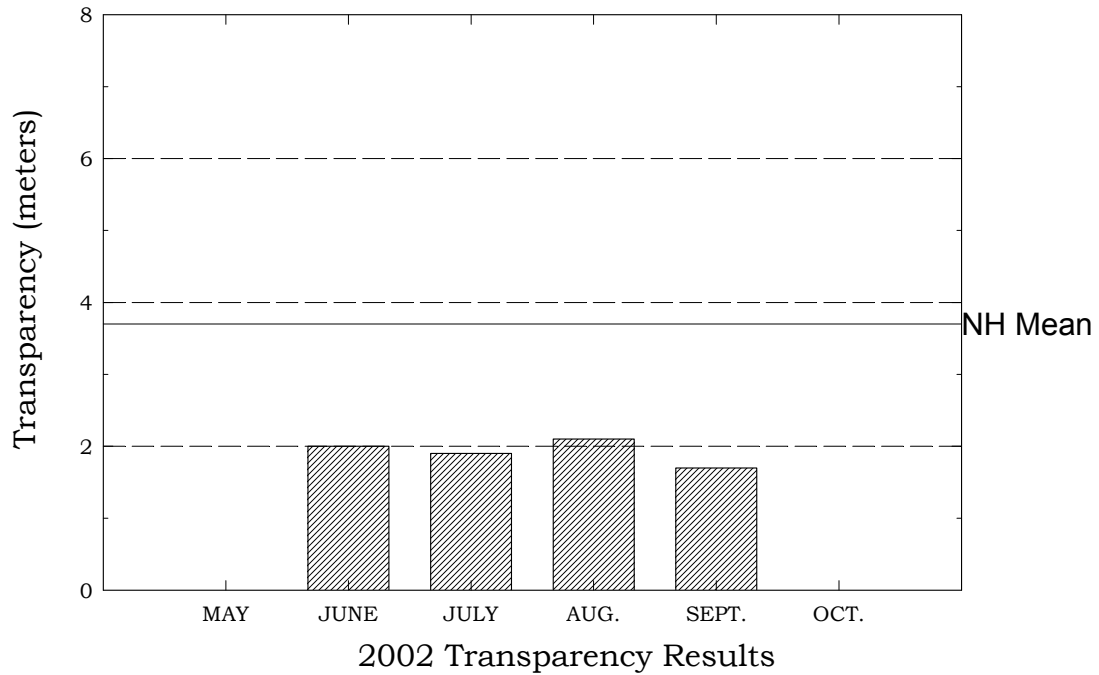
Highland Lake, North, Stoddard

Figure 2. Monthly and Historical Transparency Results



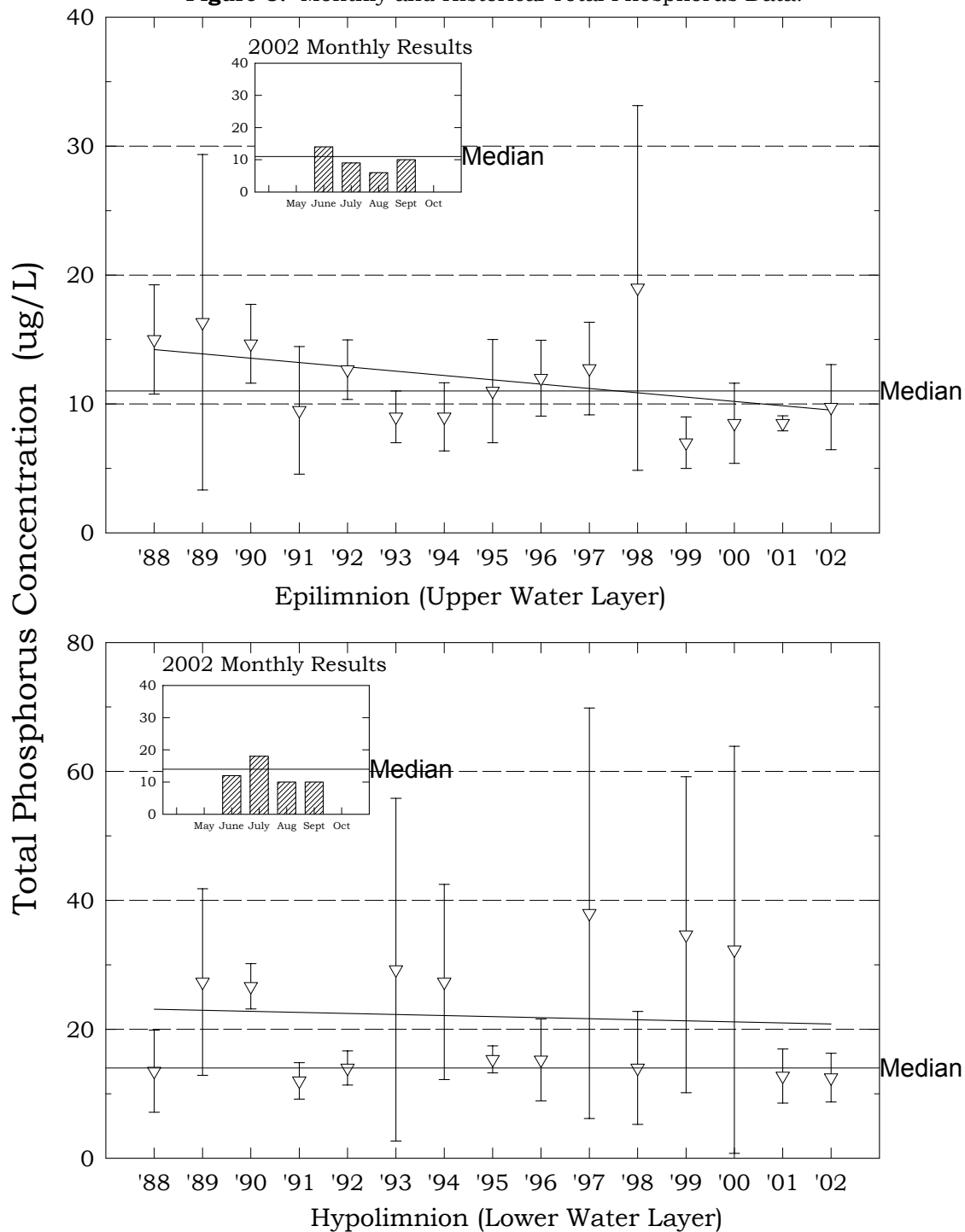
Highland Lake, South, Stoddard

Figure 2. Monthly and Historical Transparency Results



Highland Lake, North, Stoddard

Figure 3. Monthly and Historical Total Phosphorus Data.



Highland Lake, South, Stoddard

Figure 3. Monthly and Historical Total Phosphorus Data.

